

Forest Health Protection Pacific Southwest Region



Date: August 25, 2011

File Code: 3420

To: District Ranger, Mt. Hough Ranger District, Plumas National Forest

Subject: Evaluation of the Bucks Lake Campgrounds (FHP Report NE11-14)

At the request of Judy Schaber, Assistant Resource Officer, Mt. Hough Ranger District, Bill Woodruff, Forest Health Protection (FHP) Plant Pathologist and Danny Cluck, FHP Entomologist, conducted a field evaluation of the Bucks Lake Campgrounds on August 24, 2011. The objective of the visit was to evaluate the current forest health conditions within and adjacent to campsites and to provide management recommendations as appropriate. These recommendations will assist in planning vegetation and hazard tree management for the campgrounds within the Bucks Lake Fuels Reduction and Roadside Hazard Tree Removal Project (refer to FHP Report #NE11-06). Judy Schaber accompanied us in the field.

Site information

The Bucks Lake Campgrounds are located around Bucks Lake at elevations ranging between 5000 and 6000 feet (39° 53.1486"N and 121° 11.1552"W) with annual precipitation between 70 and 90 inches. Most of the area lies within the 70 to 80 inch precipitation zone with greater amounts falling along the southern edge of the project area. Forest cover is comprised of dense variations of Sierra Nevada mixed conifer with white fir (*Abies concolor*) and red fir (*Abies magnifica*) being the main overstory trees in most stands. Sugar pine (*Pinus lambertiana*), Jeffrey pine (*Pinus jeffreyi*), incense cedar (*Calocedrus decurrens*) and lodgepole pine (*Pinus contorta* var. *murrayana*) are also present but at much lower levels. Two campgrounds are located within an old burn area (circa 1926) that consists of a 45 year old Jeffrey pine plantation

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with scattered white fir and a heavy brush component (*Ceanothus* spp. and *Arctostaphylos* spp.)

Management objectives for all campgrounds include the protection and enhancement of native vegetation that will provide screening and shade for campsites and reduce the number of hazard trees.

Whitehorse and Grizzly Campgrounds

Forest insect and disease conditions

The forests in these campgrounds are a very dense mix of white fir, red fir and lodgepole pine (more lodgepole pine exists at Whitehorse) (Figure 1).

A few Jeffrey pine and incense cedar are also present in both campgrounds.

Many mature lodgepole pines have died in Whitehorse based on the presence of numerous stumps.

Heterobasidion root disease is present in a few distinct pockets in both campgrounds as evidenced by the presence of conks, or fruiting bodies, of *Heterobasidion occidentale* in old true fir stumps (Figures 2).

Conks of red ring rot (*Phellinus pini*) were observed in many lodgepole pines at both campgrounds. Some lodgepole pines had over 25 conks (Figure 3). This level of red ring rot is suspected as a contributing factor to the lodgepole pine mortality observed among the campsites at Whitehorse.

Lodgepole pine dwarf mistletoe (*Arceuthobium americanum*) was observed in the crowns of many lodgepole pines at Whitehorse. Some trees had thin foliage above heavily infected portions of the crown.

A low level of white fir dwarf mistletoe (*Arceuthobium abietinum* f. sp. *concoloris*) was observed throughout the area.

Abiotic factors such as excessive soil compaction from camping activities and shading from competing true fir are also likely to be playing a role in the observed lodgepole pine mortality.



Figure 1. Dense stand of true fir and lodgepole pine on east loop of Whitehorse Campground

Management recommendations

This stand should be thinned to an appropriate stocking level (less than 60% of the maximum Stand Density Index (SDImax) or less than 90% of normal basal area) as suggested for similar Bucks Lake area stands in FHP Report #NE11-06. In addition, thinning to target stocking levels should include the removal of large trees with crown decline (thin foliage, low crown ratio, heavy dwarf mistletoe infection, multiple dead branches or dead top, etc). Large true firs growing next to identified heterobasidion root disease pockets should also be considered for removal if crowns appear rounded at the top (a sign of stagnated growth). All lodgepole pine with *Phellinus pini* conks should be carefully inspected for decay and most likely removed, especially trees with greater than 5 five conks. Any openings created through harvest activities should be planted with Jeffrey pine and/or possibly incense cedar to increase species diversity.

When determining the carrying capacity of the site, the effects of soil compaction should be considered as site quality may be reduced. In addition, where compaction exists, trees may not respond as expected after thinning treatments.



Figure 2. Conk of *Heterobasidion occidentale*, the causal agent of heterobasidion root disease, inside an old red fir stump.

Mill and Sundew Campgrounds

Forest insect and disease conditions

These campgrounds are located within an old Jeffrey pine plantation that contains many larger diameter trees (>16" dbh). A few white fir, sugar pine, lodgepole pine and quaking aspen are also present in and around campsites. Density is variable with some overstocked pockets. Soil compaction and paving over root zones is likely reducing the site capacity and impacting the health of individual trees.

Elytroderma disease (*Elytroderma deformans*) was found on the lower crowns of Jeffrey pine causing needle dieback and branch deformities such as small brooms.

White pine blister rust (*Cronartium ribicola*) was observed on a small diameter sugar pine.



Figure 3. Conks of *Phellinus pini*, the causal agent of red ring rot, on lodgepole pine.

Jeffrey pine beetle (*Dendroctonus jeffreyi*) is currently attacking three Jeffrey pines that are adjacent to recent Jeffrey pine beetle group kills (3 and 7 trees respectively) (Figure 4). This activity appears to have started in 2009.

Management recommendations

Pine plantations within the campgrounds should be thinned to appropriate stocking levels following the upper (SDI 365) and lower (SDI 230) management zones developed by Oliver (1995) (see FHP Report #NE11-06 for more detail). Stocking levels can be varied to meet other objectives such as shading, screening, and aesthetics as long as the majority of the stands are thinned to SDI 230 or lower. No stand should be left at stocking levels above SDI 365.

When thinning these stands the District should consider removing trees of all species with excessive bole injuries, caused by vehicles and equipment, along any loop road or any trees that have a high proportion of their root zone paved over and are showing signs of declining health. Remove heavily infected elythroderma diseased trees if there are more suitable leave trees available.



Figure 4. Pitch tubes on the bole of a Jeffrey pine beetle infested tree.

All green infested Jeffrey pines should be cut and removed from the area before beetle emergence next summer. This will reduce the chance of additional mortality in these existing pockets. Older dead trees should be removed as soon as possible to eliminate the potential hazard.

Any sugar pine with a blister rust infection on the bole should be removed due to a high probability of being attacked by mountain pine beetle.

Hutchins Campground

This native mixed conifer stand is comprised of mostly red and white fir in both the over and understory. Lodgepole, sugar and Jeffrey pine are all present in the overstory but regeneration is limited to non-existent in most areas.

Heterobasidion root disease (*H. occidentale*) is prevalent throughout the campground in true fir. Many old and recent stumps containing conks testify to the substantial impact of this disease on tree health and mortality (Figure 5). Nearly all red fir are showing symptoms of crown decline, especially older trees, due to multiple factors including root disease, heavy red fir dwarf mistletoe (*Arceuthobium abietinum* f. sp. *magnificae*) and cytospora (*Cytospora abietis*) infections (Figure 6). These diseased trees are ultimately

being finished off by fir engraver beetles (*Scolytus ventralis*) and wood borers (Families: Cerambycidae and Buprestidae).

Red fir dwarf mistletoe is present in many understory trees whereas white fir appears to be relatively mistletoe free.

Compaction is likely a problem in this campground as there are no paved or gravel roads or parking areas to control vehicle traffic.

Management recommendations

Thin stand to the appropriate density for the site and use sanitation harvest to remove diseased or dead trees. Treatments should favor Jeffrey and sugar pine for retention as they are not hosts of *H. occidentale*. The presence of root disease throughout the campground may necessitate the removal of all large old true fir that show symptoms of crown decline. When marking trees for removal, the District should look for opportunities to create openings which could be planted with Jeffrey and sugar pine. Younger healthy true fir with low levels of dwarf mistletoe (mostly the white fir component) can be retained if they exhibit vigorous growth. Due to the presence of *H. occidentale*, long-term management should plan for a shorter rotation of true fir to avoid decadence and increased risk of tree failure. Removal of true fir will result in a positive composition shift which favors pine species.

Considerations for all campgrounds

Trees in the Bucks Lake campgrounds, like most forested campgrounds, are exposed to additional stress factors that can compromise their health and vigor. Firewood collecting sometimes leads to tree wounding from hatchets and saws. Carving and chopping trunks can cause extensive cambium damage. Foot and vehicle traffic compacts soil and can damage roots. Posting public information signs at campground entrances may help increase awareness of the human impact on campground trees.



Figure 5. Conks of *Heterobasidion occidentale*, inside an old red fir stump at Hutchins Campground.



Figure 6. Diseased red fir with declining crown.

Soil compaction can predispose conifers to bark beetle attacks and subsequent mortality. Compaction can reduce the water holding capacity of the soil and suffocate roots, which limits the available oxygen that is necessary for root growth and survival. Damaged and unhealthy roots cannot provide the upper portions of the tree with the water and nutrients it requires to maintain its natural defenses. Soil compaction and associated root injury are long-term problems that may not reveal themselves until several years after the damage has occurred. In order to minimize future soil compaction and root damage, campers should be directed to specific travel corridors from campsites to restrooms, water sources, and specific recreation areas. It is especially important to divert and limit foot and vehicle travel and keep excavation for roads, trails and utilities away from the root zones of trees.

It is important to know that when cutting trees in recreation areas, all conifer stumps greater than 3" in diameter must be treated with a registered borate compound (FSM R5 Supplement 2300-92-1 modified by FSH R5 Supplement 3409.11-2010-1) to reduce the probability of infection by *Heterobasidion occidentale* and *H. irregulare*. The causal agents of heterobasidion root disease (formerly referred to as annosus root disease).

Hazard tree management for campgrounds

Roadside and recreation areas around Bucks Lake invite the public to stop, take pictures, hike, picnic and spend extra time within forested areas. This increases our liability in regards to hazard trees, especially with the presence of heterobasidion root disease in true fir. To abate potential hazards, true fir with suspected of root disease should be removed whenever a target (people or property) exists. To assess trees for root disease, it is reasonable to use the condition of the crown as an indicator of advanced decay. Although not always caused by root decay, a thin crown and/or short leader growth does indicate poor tree vigor. A tree with reduced photosynthesis is not able to maintain healthy roots as well as a tree with a full and healthy crown. In the presence of root disease, unhealthy roots will likely be overcome with decay faster than vigorously growing roots. For this reason, the thinner the crown of a tree in an area where root disease is confirmed, the more likely it is that the roots have been weakened by decay.

Despite the effectiveness of any long or short-term plans to prevent tree injury and mortality, some trees, through declining health, will eventually become hazards to the public. To minimize the risks, hazard trees should be identified and removed before they fail. The current practice for many National Forest campgrounds and summer home tracts is to remove trees as they die. This eliminates the risk from dead trees but fails to address living trees that are infected with root disease, heart rot, and/or have a structural defect. These high-risk green trees are equally hazardous and should not be overlooked. Therefore, it is recommended that the Forest develop a hazard tree evaluation and monitoring plan for these recreation areas. At your request, Forest Health Protection can provide information and assist with the development of this plan (an R5 FHP Hazard Tree Guide will be available by fall 2011). In the short-term, trees within the campgrounds and summer home tracts, and within striking distance of a target, that have obvious stem decay, dead tops and/or large dead branches should be carefully evaluated and hazards removed or pruned as soon as possible. All standing dead trees within striking distance of any target should be removed immediately.

Potential for FHP Funding

Forest Health Protection may be able to assist with funding for thinning and removing green material from overstocked areas within the Bucks Lake Project and the Bucks Lake Campgrounds. Thinning projects in this area would meet the minimum requirements for Western Bark Beetle Program funding and are supported by this evaluation and FHP Report #NE11-06. If you are interested in this competitive funding please contact me for assistance in developing and submitting a proposal.

If you have any questions regarding this report and/or need additional information please contact me at 530-252-6431 or email dcluck@fs.fed.us.

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